

REMARKS

Claims 1-39 were pending, though Claims 9-32 and 36-39 have been withdrawn from consideration.

Claim 8 has been cancelled, without prejudice or disclaimer of that which is defined thereby.

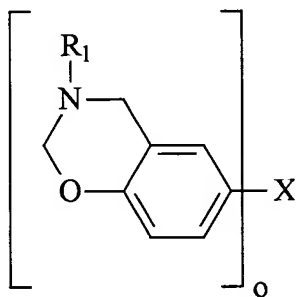
Claims 1-5, 33 and 35 have been amended, with one of the amendments to Claim 1 simply placing proper Markush language into the claim, and the second amendment adding a weight limitation to the toughener. Support for this latter amendment may be found in the Examples, such as in Tables 3a and 3b. (Though Tables 3a and 3b display the amount of the constituents in parts, the total parts add up to 100. Thus, parts may be converted directly to weight percent using the same number values.) Each of Claims 33 and 35 have been amended to correct a typographical error.

Accordingly, Claims 1-7 and 33-35, drawn to a composition, remain in active prosecution.

Those claims stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,429,157 ("Kishi") in view of U.S. Patent Nos. 5,543,516 (Ishida I") and 6,207,786 ("Ishida II"). Applicants traverse these Section 103 rejections.

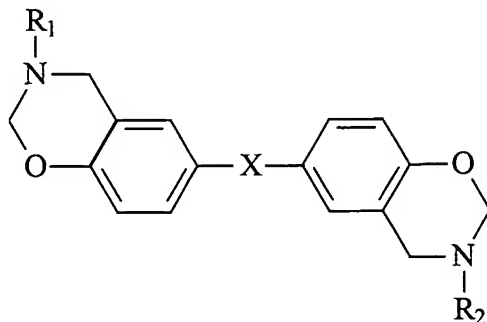
For the Examiner's benefit, Applicants provide a brief review of the present invention, with reference to that which is claimed in the subject application. The present invention broadly speaking is directed to a heat curable composition of a benzoxazine and a toughener.

The benzoxazine component in one aspect of the invention is defined as being within the following structure



where o is 1-4, X is a direct bond (when o is 2), alkyl (when o is 1), alkylene (when o is 2-4), carbonyl (when o is 2), thiol (when o is 1), thioether (when o is 2), sulfoxide (when o is 2), and sulfone (when o is 2), and R₁ is alkyl. In this aspect, the toughener which is combined with the benzoxazine is defined as an acrylonitrile-butadiene co-polymer having secondary amine terminal groups and is required to be present in the composition of this aspect of the invention in an amount of about 5 weight percent or more.

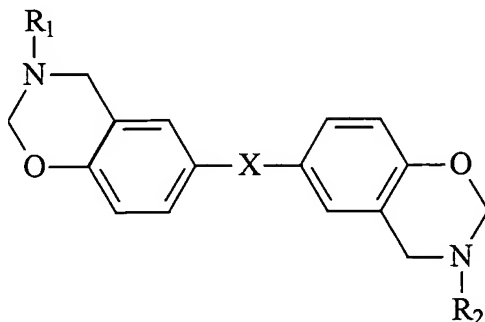
In another aspect of the invention, the benzoxazine component is defined as being within the following structure



where X is selected from a direct bond, CH₂, C(CH₃)₂, C=O, S, S=O and O=S=O, and R₁ and R₂ are the same or different and are selected from methyl, ethyl, propyls and butyls. In this aspect, the toughener component is defined as before. Here, the cured reaction products of the composition are capable of demonstrating at least one of a wet Tg of at least 350°F, a toughness measured by GI_c of at least 1.9 in-lb./in², a percent decrease in ΔH of at least 15% compared with a benzoxazine prepared from bisphenol F and aniline, and a percent decrease in wet Tg compared with dry Tg with increased toughener concentration of less than 6%.

In yet another aspect of the invention, the benzoxazine component is defined with reference to the previous structure and defines X as C(CH₃)₂.

In still another aspect of the invention, the benzoxazine component is defined as being within the following structure



where X is selected from a direct bond, CH₂, C(CH₃)₂, C=O, S, S=O and O=S=O, and R₁ and R₂ are the same or different and are selected from methyl, ethyl, propyls and butyls. The toughener component is once again defined the same way. In this aspect, Tg and toughness measured by GI_c increase as the amount of toughener in the composition increases.

In a further aspect of the invention, the benzoxazine component is defined with reference to the previous structure and defines X as C(CH₃)₂. In this aspect, Tg and toughness measured by GI_c increase as the amount of toughener in the composition increases.

Kishi, the document cited as a primary reference against the pending claims, does not disclose, teach or suggest the invention defined in these ways.

More specifically, Kishi is directed to and claims in one aspect a woven fabric prepreg of (A) a woven fabric comprising a plurality of reinforcing fibers; (B) a thermosetting matrix resin surrounding the fibers; and (C) 2-15% by weight of fine particles having a particle size of 1-50 um of polyamides, polyethers, polyesters, polyimides, polysulfones and polyurethanes. The woven fabric prepreg has a cover factor of 95% or more.

In another aspect, Kishi is directed to and claims a honeycomb sandwich panel having (D) a honeycomb core; and a skin panel of the so-defined woven fabric prepreg.

Kishi speaks generally about using solid rubbers seemingly as the thermosetting resin, such as ones functionalized with carboxyl groups or amino groups. Kishi calls out a solid acrylonitrile-butadiene rubber as a preferred one (col. 9, line 66 - col. 10, line 9).

Kishi, in Examples 1, 2 and 3 (Examples 4 and 5 simply change the type of particle added), identifies a solid carboxyl group-containing acrylonitrile butadiene rubber (NIPOL 1072 produced by Nippon Zeon Co., Ltd.) as a constituent, expressed

in each case on a parts by weight basis. Normalizing the parts by weight to weight percent shows that Example 1, which used 4 parts of that rubber, employed the rubber at 2.484 weight percent; Example 2, which used 5 parts of that rubber, employed the rubber at 3.030 weight percent; and Example 3, which used 5 parts of that rubber, employed the rubber at 2.994 weight percent.

Initially, Applicants point out these Examples use a different rubber -- a carboxyl group containing one, instead of a secondary amine containing one -- and the amount used in each Example is less than the required "about 5 weight percent or more" now present in the claims. In fact, the claims as amended now require at least about 2 weight percent (or 40 percent) more toughener -- irrespective of the type -- than is suggested by Kishi.

In addition, Kishi is concerned with room temperature performance in the context of self-adhesive materials, rather than improved high temperature performance, which Applicants express in the subject application in terms of wet Tg (such as a wet Tg of at least 350°F), toughness (such as measured by GI_c of at least 1.9 in-lb./in²), percent decrease in ΔH (such as of at least 15% compared with a benzoxazine prepared from bisphenol F and aniline), percent decrease in wet Tg compared with dry Tg

with increased toughener concentration (such as of less than 6%), and the increase of Tg and toughness measured by GI_c as the amount of toughener increases. Such measurements are not even suggested as obtainable in Kishi, which is not surprising because of the different objective -- room temperature performance.

Against this background, Applicants review for the Examiner's benefit the two U.S. patent documents cited as secondary references in support of the Section 103 rejections.

The first, Ishida I, as noted by the Examiner speaks to a method of manufacturing a benzoxazine.

The second, Ishida II, speaks to ternary blend of benzoxazine, epoxy and phenolic resin.

Neither Ishida I nor II remedy the deficiencies of Kishi as a primary reference, and thus collectively do not disclose, teach or suggest the invention as now claimed.

That is, neither Ishida I nor II disclose, teach or suggest the use of a toughener at all, let alone one based on acrylonitrile butadiene, much less one that is functionalized with secondary amine groups. And what's more there is no suggestion to use such a toughener in an amount of about 5 weight percent or more.

Simply put there is no motivation to combine the two secondary references with the primary one to reach Applicants' invention as claimed. Moreover, despite the attempt to construct an obviousness rejection based on these three U.S. patent documents, that attempt is flawed because even if it were appropriate to combine the respective documents with one another (which Applicants dispute), the combination still does not disclose, teach or suggest the invention as claimed.

Based on the above, Applicants respectfully request reconsideration and withdrawal of the Section 103 rejections.

In addition, Applicants note that attached to the Action are initialed PTO Forms 1449, receipt of which Applicants are grateful. However, Applicants also note that on those forms the Examiner instead of placing her initials in the column next to the listing of the documents in the section of the forms styled "Other Documents", has placed a line through each listed citation and has failed to indicate why those documents have not been considered. Applicants therefore request that the Examiner either indicate why the listed citations have not been considered or in fact consider them and include together with the next written communication from the Patent and Trademark Office another set of PTO Forms 1449 with her initials next to the listed citations. For the Examiner's convenience,

Application No. 10/607,111
Amendment dated October 25, 2005
Office Action of July 26, 2005

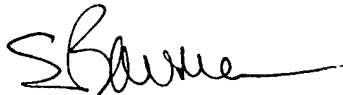
Applicants present fresh copies of each of the submitted PTO forms 1449 and copies of the listed citations.

Applicants submit that the pending claims are patentable over any or all of the documents listed on the PTO Forms 1449 and the Notice of References Cited.

Applicants respectfully request a prompt and favorable re-examination of the subject application.

Applicants' undersigned attorney may be reached by telephone at (860) 571-5001, by facsimile at (860) 571-5028 or by e-mail at steve.bauman@us.henkel.com. All correspondence should be directed to the address given below.

Respectfully submitted,



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